

Claims

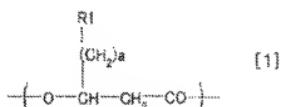
1. (Currently Amended) A encapsulated structure containing a mixture of a polyhydroxyalkanoate and a magnetic substance, the structure comprising:

an external phase part containing the polyhydroxyalkanoate and the magnetic substance; and

an internal phase part, which is contained in the external phase part.

2. (Original) A structure according to claim 1, wherein the structure is in the form of a microcapsule where the external phase part forms a shell and the internal phase part forms a core.

3. (Previously Presented) A structure according to claim 1, wherein the polyhydroxyalkanoate comprises polyhydroxyalkanoate including at least one selected from the group consisting of monomer units represented by formulae [1] to [10]:



wherein the monomer unit is at least one selected from the group consisting of monomer units having respective combinations of R1 and as follows:

a monomer unit where R1 represents a hydrogen atom and a represents an integer from 0 to 10;

a monomer unit where R1 represents a halogen atom and a represents an integer from 1 to 10;

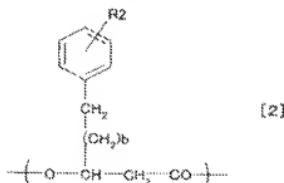
a monomer unit where R1 represents a chromophore and a represents an integer from 1 to 10;

a monomer unit where R1 represents a carboxyl group or a salt thereof and a represents an integer from 1 to 10; and

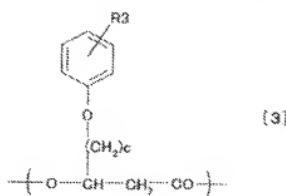
a monomer unit where R1 represents



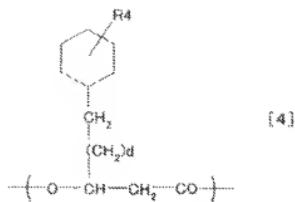
and a represents an integer from 1 to 7;



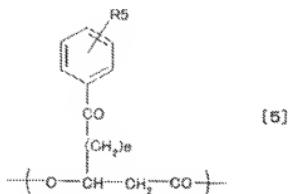
wherein b represents an integer from 0 to 7, and R2 represents one selected from the group consisting of a hydrogen atom, a halogen atom, -CN,  $NO_2$ ,  $-CF_3$ ,  $-C_2F_5$ , and  $-C_3F_7$ .



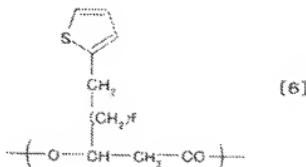
wherein c represents an integer from 1 to 8, and R3 represents one selected from the group consisting of a hydrogen atom, a halogen atom, -CN,  $-NO_2$ ,  $-CF_3$ ,  $-C_2F_5$ , and  $-C_3F_7$ .



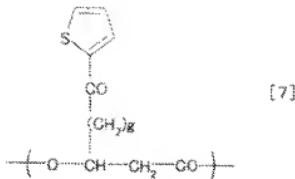
wherein d represents an integer from 1 to 7, and R4 represents one selected from the group consisting of a hydrogen atom, a halogen atom, -CN, -NO<sub>2</sub>, -CF<sub>3</sub>, -C<sub>2</sub>F<sub>5</sub>, and -C<sub>3</sub>F<sub>7</sub>;



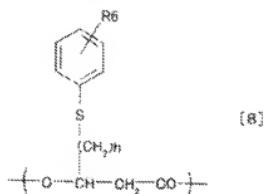
wherein e represents an integer from 1 to 8, and R5 represents one selected from the group consisting of a hydrogen atom, a halogen atom, -CN, -NO<sub>2</sub>, -CF<sub>3</sub>, -C<sub>2</sub>F<sub>5</sub>, -C<sub>3</sub>F<sub>7</sub>, -CH<sub>3</sub>, -C<sub>2</sub>H<sub>5</sub>, and -C<sub>3</sub>F<sub>7</sub>;



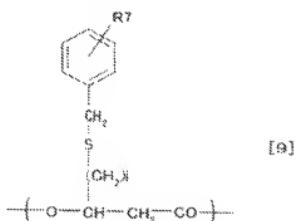
wherein f represents an integer from 0 to 7;



wherein *g* represents an integer from 1 to 8;

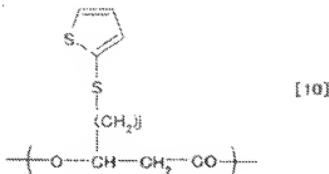


wherein *h* represents an integer from 1 to 7, and R6 represents one selected from the group consisting of a hydrogen atom, a halogen atom, -CN, -NO<sub>2</sub>, -COOR', -SO<sub>2</sub>R'', -CH<sub>3</sub>, -C<sub>2</sub>H<sub>5</sub>, -C<sub>3</sub>H<sub>7</sub>, -CH(CH<sub>3</sub>)<sub>2</sub>, and -C(CH<sub>3</sub>)<sub>3</sub>, where R' represents one of a hydrogen atom, Na, K, -CH<sub>3</sub>, and -C<sub>2</sub>H<sub>5</sub> and R'' represents one of -OH, -ONa, -OK, a halogen atom, -OCH<sub>3</sub>, and -OC<sub>2</sub>H<sub>5</sub>;



wherein *i* represents an integer from 1 to 7, and R7 represents one selected from

the group consisting of a hydrogen atom, a halogen atom, -CN, -NO<sub>2</sub>, -COOR', and -SO<sub>2</sub>R', where R' represents one of a hydrogen atom, Na, K, -CH<sub>3</sub>, and -C<sub>2</sub>H<sub>5</sub>, and R" represents one of -OH, -ONa, -OK, a halogen atom, -OCH<sub>3</sub>, and -OC<sub>2</sub>H<sub>5</sub>; and



wherein j represents an integer from 1 to 9.

4. (Original) A structure according to claim 1, wherein the polyhydroxyalkanoate has a number average molecular weight of 5,000 to 1,000,000.

5. (Original) A structure according to claim 1, wherein a monomer unit composition of the polyhydroxyalkanoate varies in a direction from the inside toward the outside of the structure.

6. (Original) A structure according to claim 1, wherein at least a portion of the polyhydroxyalkanoate comprises a chemically modified polyhydroxyalkanoate

7. (Currently Amended) A method for manufacturing method for an encapsulated structure containing a mixture of a polyhydroxyalkanoate and a magnetic substance, the structure having an external phase part containing the polyhydroxyalkanoate and

the magnetic substance and an internal phase part, which is contained in the external phase part with at least one of the external phase part and the internal phase part containing a magnetic substance, the method comprising the steps of:

preparing a liquid raw material including an oil phase containing the polyhydroxyalkanoate and an organic solvent, a water phase, and the magnetic substance; and removing at least one of the organic solvent and the water from the liquid raw material,

wherein the inner phase part being is contained in the external phase part including the polyhydroxyalkanoate PHA-derived from the oil phase or the water phase, and wherein at least one of the external phase part and the internal phase part containing contains the magnetic substance.

8. (Currently Amended) A manufacturing-method for a structure according to claim 7, further comprising the a step of preparing an emulsion using the water phase and the oil phase

9. (Currently Amended) A manufacturing-method for a structure according to claim 8, further comprising the steps of:

preparing a W/O type emulsion by dispersing the water phase in the oil phase; and removing at least one of the organic solvent and the water from the W/O type emulsion.

10. (Currently Amended) A manufacturing-method for a structure according

to claim 8, further comprising the steps of:

preparing a W/O type-emulsion by dispersing the water phase in the oil phase;

preparing a W/O/W type emulsion by dispersing the W/O type-emulsion in a second water phase; and

removing at least one of the organic solvent and the water from the W/O/W type emulsion.

11. (Currently Amended) A manufacturing-method for a structure according to claim 8, further comprising the steps of:

preparing an O/W type-emulsion by dispersing the oil phase in the water phase; and

removing at least one of the organic solvent and the water from the O/W type emulsion.

12. (Currently Amended) A manufacturing-method for a structure according to claim 7, wherein the removal of at least one of the organic solvent and the water is performed by at least one method selected from the group consisting of a submerged drying method, a phase separation method, and a spray drying method.

13. (Currently Amended) A method for manufacturing method for a an encapsulated structure containing a mixture of a polyhydroxyalkanoate and a magnetic substance, the structure having an external phase part containing the polyhydroxyalkanoate and the magnetic material and an internal phase part, which is contained in the external phase part, at

least one of the external phase part and the internal phase part containing a magnetic substance;  
the method comprising the steps of:

preparing a water phase containing a polyhydroxyalkanoate synthetic enzyme and a 3-hydroxyacyl coenzyme A;

preparing an oil phase containing an organic solvent;

preparing an emulsion containing the water phase, the oil phase, and the magnetic substance;

synthesizing the polyhydroxyalkanoate by polymerizing the 3-hydroxyacyl coenzyme A with the polyhydroxyalkanoate synthetic enzyme in the emulsion; and

removing at least one of the organic solvent and the water from the emulsion,

wherein the inner phase part being is contained in the external phase part including the polyhydroxyalkanoate PHA-derived from the oil phase or the water phase, and  
wherein at least one of the external phase part and the internal phase part containing contains the magnetic substance.

14. (Currently Amended) A ~~manufacturing~~ method for a structure according to claim 13, further comprising the steps of:

preparing a W/O type emulsion by dispersing the water phase in the oil phase; and

removing at least one of the organic solvent and the water from the W/O type emulsion.

15. (Currently Amended) A ~~manufacturing~~ method for a structure according to claim 13, comprising the steps of:

preparing a W/O type-emulsion by dispersing a first water phase in the oil phase;

preparing a W/O/W type-emulsion by further dispersing the W/O type-emulsion in a second water phase; and

removing at least one of the organic solvent and the water from the W/O/W type emulsion.

16. (Currently Amended) A manufacturing-method for a structure according to claim 15, wherein at least one of the first water phase and the second water phase contains a polyhydroxyalkanoate synthetic enzyme and a 3-hydroxyacyl coenzyme A.

17. (Currently Amended) A manufacturing-method for a structure according to claim 13, further comprising the steps of:

preparing an O/W type-emulsion by dispersing the oil phase in the water phase; and

removing at least one of the organic solvent and the water from the O/W type emulsion.

18. (Currently Amended) A manufacturing-method for a structure according to claim 13, comprising the steps of:

preparing an O/W type-emulsion by dispersing a first oil phase in the water phase;

preparing an O/W/O type-emulsion by further dispersing the O/W type-emulsion in a second oil phase; and

removing at least one of the organic solvent and the water from the O/W/O type

emulsion.

19. (Currently Amended) A manufacturing method for a structure according to claim 14, wherein a composition of a 3-hydroxyalkanoate unit in the polyhydroxyalkanoate varies in a direction from the an inside to the an outside of the structure by changing a composition of the 3-hydroxyacyl coenzyme A with time.

20. (Original) A structure according to claim 1, wherein the internal phase contains a pharmaceutical component.

21. (Previously Presented) A structure according to claim 1, wherein the internal phase also contains the magnetic substance.